United States Patent [19]

Jones

[11] **3,877,124**

[45] **Apr. 15, 1975**

[54] **COATING ROLLER**

[75] Inventor: **David Peter Marshall Jones,** Ilford, England

[73] Assignee: **Ilford Limited,** Essex, England

[22] Filed: **Sept. 20, 1973**

[21] Appl. No.: **399,137**

[30] **Foreign Application Priority Data**

Sept. 28, 1972 United Kingdom 44791/72

[52] **U.S. Cl.** ..... **29/121 H**

[51] **Int. Cl.** **B21b 27/02**

[58] **Field of Search** ..... 29/121 H, 132

[56] **References Cited**

UNITED STATES PATENTS

40,845	12/1863	Lambert	29/121 H
1,123,388	1/1915	Schaanning	29/121 H
1,304,694	5/1919	Marquette	29/121 H X
2,108,013	2/1938	Fehr	29/121 H X
2,367,005	1/1945	Clarke	29/121 H X

Primary Examiner—Alfred R. Guest

Attorney, Agent, or Firm—Wenderoth, Lind & Ponack

[57] **ABSTRACT**

Apparatus for treating web material which comprises at least one power-transmitting or supporting roller for web material which consists of a rigid roller, the driving surface of which is covered with a helically wound filament. The filament may be of suitable plastics materials, e.g. nylon, or of metal, preferably of stainless steel. The interstices between the roller and the filament may be filled with a resin, preferably by coating the roller with a soft resin before or whilst the filament is applied thereto or alternatively by coating the roller after being wound with the filament with an organic solvent solution of a resin which is able to permeate between the filaments so that when the solvent has evaporated, the interstices are left filled with resin.

1 Claim, 2 Drawing Figures

FIG.1

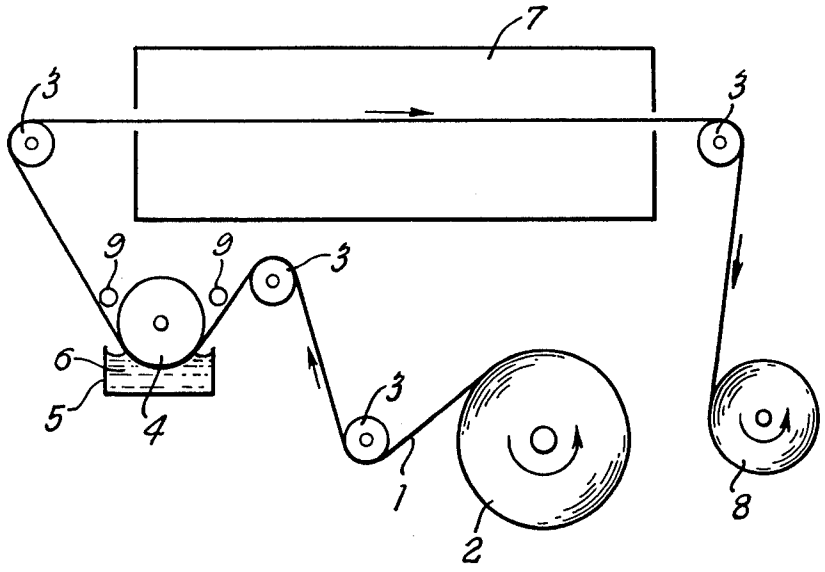
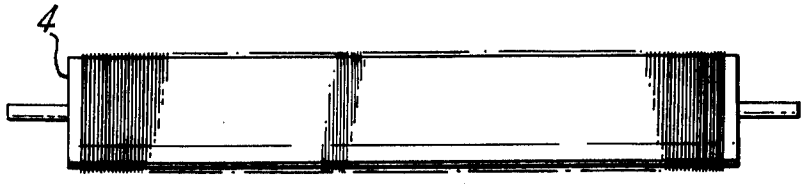


FIG.2



COATING ROLLER

BACKGROUND OF THE INVENTION

This invention relates to power-transmitting rollers for traversing web material through treating apparatus.

In most apparatus wherein web material is coated, dried or otherwise treated, there is at least one power-transmitting roller around which the web is partially lapped in order to drive or retard the web passing through the apparatus. However one of the troubles experienced with such power-transmitting rollers is the fault known as "aeroplaning" that is to say the web does not tightly lap the roller and thus is not driven efficiently by the roller. Such aeroplaning is due to air becoming entrapped between the web and the power-transmitting roller. This fault is often overcome by providing a microgroove surface on the power-transmitting roller. Such a microgroove surface consists typically of a groove of the dimensions 0.005 inch deep by 0.055 inch wide machined in a spiral over the entire face of the roller.

Such a microgroove surface improves the grip between the roller and the web and thus tends to prevent aeroplaning of the web. It also allows a suction to be applied continuously round the roller in order to increase the grip between the roller and the web when small angles of lap of the web over the roller have to be employed. However it is both costly and difficult to obtain a suitable microgroove surface and when the material of the driving roller has to be chosen for reasons other than ease of manufacture these difficulties are increased.

SUMMARY OF THE INVENTION

It is the object of the present invention to provide an apparatus which comprises a power-transmitting roller for web material which has a microgroove surface which is comparatively easy and cheap to prepare.

According to the present invention there is provided an apparatus for treating web material which comprises at least one power-transmitting roller for web material which consists of a rigid roller, the driving surface of which is covered with a helically wound filament. The filament may be of suitable plastics materials, e.g. nylon, or of metal, preferably of stainless steel. Most preferably the diameter of the filament is from 0.0025 to 0.025 inch (i.e. from 0.00635 cm to 0.0635 cm).

The surface of the roller of use in the present invention is comparable with the surface of a roller which has been microgrooved. However, it is very easy to prepare a helically wound filament covered roller of this type and moreover if the surface of the roller is damaged in any way the filament can be removed and replaced by fresh filament. Further if it is required that the surface of the roller be stainless steel it is possible to wind stainless steel wire on to a rigid roller composed of another material.

The presence of the filament winding on the roller core enables a suction or negative pressure to be exerted around the roller. This helps a power-transmitting roller to grip the travelling web.

If it is essential that foreign matter picked up by the driving roller shall not become lodged in the interstices between the roller and the filament it is preferred that these interstices be filled with a resin. This may be achieved by coating the roller with a soft resin before

the filament is applied thereto or whilst the filament being applied. Alternatively the roller after being wound with the filament may be coated with an organic solvent solution of a resin which is able to permeate between the filaments so that when the solvent has evaporated, the interstices are left filled with resin.

The power-transmitting filament-covered driving roller of use in the present invention may be used not only to drive a web through an apparatus but also simultaneously to support a web at the point of application of a liquid coating on the web. This use is shown in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings will serve to illustrate the invention.

FIG. **1** is a diagrammatic cross-sectional view of a travelling web-treating apparatus which comprises a wire wound driving roller as hereinbefore described.

FIG. **2** is a side elevation of the wire wound driving roller used in FIG. **1**.

DETAILED DESCRIPTION OF THE DRAWINGS

In FIG. **1** a film web **1** is being unwound from a stock roll **2** by a driving roller which is also acting as a coating roller. The driving roller **4** is a mild steel roller the entire surface of which has been covered with a helically wound stainless steel wire of 0.0075 inch diameter. The wire has been wound on to the mild steel core after the core has been covered with a layer of resin. This ensures that the interstices between the wire strands are filled with the resin so that any particles picked up from the web can not become lodged there. The helically wound wire on roller **4** is shown in FIG. **2**.

The web **1** passes over various free-running rollers **3**, both before and after roller **4**. The web **1** is partially lapped around roller **4** which is partially immersed in aqueous coating liquid **6** in a treating material reservoir such as trough coating applicator **5**. Thus the roller **4** serves to pull the web **1** off the stock roll **2** and to support the web at the point of application of the aqueous coating liquid **6** on to the web. After the web has been coated with the liquid **6** it is led into a drying cabinet **7** and then is wound on to another stock roll **8** which is rotatably driven.

The grip exerted on the web by the wire covered roller **4** is increased by the suction created by two suction tubes **9**. This creates continuously a negative pressure around the roller.

The angle of lap of the web **1** over the driving roller **3** is shown to be rather small. This often occurs when it is required to fit a web processing apparatus into an already built and confined space. The presence of the wire winding on the core of the roller ensures that the driving roller is able to exert a good grip on the web. The strength of this grip in increased by the suction effort created by the suction tubes **9**. The presence of the wire winding on the roller does not effect the uniformity of the coating on the web and no marks due to the wirewinding are present on the final dried coating.

I claim:

1. An apparatus for treating web material, said apparatus comprising at least one power-transmitting roller for driving said web material and comprising a rigid roller, the outer surface of which is covered with a helically wound stainless steel wire having a diameter of from 0.00635 to 0.0635 cm. and a resin filling the interstices between said stainless steel wire and said roller.

* * * * *